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ABSTRACT

Successful integration of technology is dependent on the thoughtful plans, strategies, and provisions developed by knowledgeable educators to meet the needs of their students. Advances in technology and its increasing availability in K-12 schools make it incumbent upon administrators and teachers to make use of today's technology-related learning tools. This paper presents teachers' accounts about their efforts and vexations regarding integrating technology into classroom practice. Many teachers feel their voices have not been heard by the organizational culture. The paper gives voice to teachers' concerns regarding issues such as training, arrangements for facilities, security policies, management strategies, and procedures for technical support. Additionally, the paper focuses on pertinent issues and considerations resulting from actual situations experienced by classroom teachers and administrators in their attempts to infuse technology in their schools. (Author/AEF)

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Muffled Voices: Teachers' Concerns Regarding Technological Change

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Abstract: Successful integration of technology is seldom serendipitous. Successful infusion of technology is dependent on the thoughtful plans, strategies, and provisions developed by knowledgeable educators to meet the needs of their students. Advances in technology and its increasing availability in K-12 schools make it incumbent upon administrators and teachers to make use of today's technology-related learning tools. This paper presents teachers' accounts about their efforts and vexations regarding integrating technology into classroom practice. Unfortunately, many teachers feel their voices have not been heard by the organizational culture. The authors give voice to teachers' concerns regarding issues such as training, arrangements for facilities, security policies, management strategies, and procedures for technical support. Additionally, the paper focuses on pertinent issues and considerations resulting from actual situations experienced by classroom teachers and administrators in their attempts to infuse technology in their schools.

Not long ago, most administrators and teachers could easily ignore the computer revolution and disregard the technological advances that had drastically impacted and changed business and industry. However, the infusion of technology into educational settings has now been identified as a national priority, and many states, supported by the United States Congress, the President, and state legislatures are mandating the use of computer related technologies. Although critics argue that schools are rushing to jump on the latest education bandwagon, it appears evident that educational environments cannot survive without implementing electronic media and instructional technologies. Indeed, today's schools are in a period of transformation.

Technology Demands Change in Schools

Peter F. Drucker (1995), one of the most respected management thinkers of our time, stated "It is a safe prediction that in the next fifty years, schools and universities will change more and more drastically than they have since they assumed their present form more than three hundred years ago, when they reorganized themselves around the printed book" (pg. 79). These changes are being driven by a number of forces which include recent innovative technology such as multimedia microcomputers, DVDs, CD-ROMs, interactive distance learning and virtual reality capabilities; by the demands of federal/state politicians and business leaders; and certainly, by the demands of our present day knowledge-based society. Increasingly, parents, boards of education, and district and state education departments expect administrators and teachers to make use of today's computer-related learning tools.

Millions of dollars have recently been allocated on federal, state, and local levels to equip schools with technologies which will change their very structure. Today's technological changes are not simply limited to the delivery of instruction. That is, the advent of standalone microcomputers has placed the

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power of technology directly in the hands of educators, and the image of technology has shifted from replacing teachers to supplementing and enhancing teacher-based instruction (Roblyer, Edwards, & Havriluk, 1997). This paradigm shift holds important implications for educators, for although no one can be sure what the future will bring given the complexity of technological advancements, administrators can assuredly predict that they will be responsible for developing sound technology strategies and shared leadership plans with teachers to integrate technology related tools into the curriculum.

Administrators and Teachers As Technology Leaders

According to the seminal Rand Corporation Change Agent Study, administrators must evidence support for technology, or technology innovations will be ignored by teachers (McLaughlin & Berman, 1977). Therefore, if educators are to succeed with the increasingly complex task of technology deployment, they must ensure that technological change has a broad base of support and that leadership is a shared endeavor. "Success with technology is rarely serendipitous. Certain clear factors profoundly affect whether technology helps education take a leap forward or a pratfall" (Roblyer, Edwards & Havriluk, 1997, 28).

It could be argued that most teachers and administrators are struggling to understand their respective roles and responsibilities in an attempt to justify the expensive and time-consuming task of integrating technology into today's classrooms. This is not surprising since the educational institution as a whole clearly has not understood nor addressed many of the external forces that have driven the development of new technologies. It is a given that educators are in a difficult position to serve as technology leaders for their schools; however, for administrators the human dynamics of integrating technology impose one clear imperative: they must listen and respond to teachers' concerns about the technological venture. Based on our experiences, interactions, and informal interviews with teachers, the following recurrent themes appear to be central to teachers efforts and vexations regarding integrating technology into classroom practice. A primary purpose of this paper is to give voice to teachers concerns.

Training for Teachers and Administrators

Experts in the field of technology acknowledge that technology involvement can pose an intimidating challenge under the best of circumstances. Most teachers and administrators feel threatened by this challenge because it represents a journey into the unknown, and they know that they are inadequately prepared. "If technology is to be widely used, teachers and administrators need training. Training to use technology must be a part of every entry-level teacher's preparation and should continue throughout a teacher's career so that he or she can keep abreast of developing technologies" (National Governors' Association, 1991). The teacher's role is a critical factor in the use of computers in the classroom (Office of Technology Assessment (OTA), 1995). As Hebenstreit noted:

> It has been said that computers can improve education if they are used at the right place, at the right time, with the right amount and in the right way, but to meet all these conditions teachers have to be trained to use the computer that way. The mere presence of computers in schools does not guarantee that education will be improved.... (1992, p.59).

Administrators must be advocates of educators' training due to the fact that teacher training in the use of computers is absolutely essential. Without endorsement by teacher practitioners, the utilization of computers in education will not occur (Hebenstreit, 1992). In the nationwide OTA (Office of Technology Assessment) study of the use of technology in education, lack of training and limited knowledge about computers were the most commonly cited reasons for non use of computers (Office of Technology Assessment, 1995). Recent studies continue to report that properly trained teachers make the difference between success or failure of technology integration efforts (Siegel, 1995).

A school-site technology lead teacher explains, "Teacher do not want to get training because they are so angry about the way computers have been shoved in their classrooms. They have not been involved in the planning process, and no one has even asked teachers if they wanted computers! Computers are being dumped in classrooms without even tables to put them on." A high school English teacher stated that

most teachers in his building are still struggling with the basic skills needed to operate the computers. He refers to these educators as "teachers with two hands on the mouse." They can not "drag and click" let alone use software programs for instruction.

Unfortunately, many school systems have spent their technology budgets largely for the purchase of hardware and software. Teachers have been instructed to "learn on your own," after attending one-shot inservice sessions. Teachers are frustrated because learning computer skills requires the ability to absorb so many different concepts and also requires a great deal of time to practice and experiment before they feel confident enough to involve their students. One veteran teacher explains, "Years ago most teachers would not show movies in their classrooms because they did not know how to thread the movie projector. The situation with computers is just the same; however, the financial investment is much greater."

Research indicates that most school districts spend less than a quarter of their computer budgets on training (Bruder, 1993). Therefore, the rate of hardware and software acquisition has continuously outpaced the rate of computer-related professional development. Perhaps rethinking budget priorities for professional development is long overdue

Teachers are being told to create a school environment that integrates new technologies requiring radical changes in their teaching strategies (Collins, 1991), and yet, teachers justifiably complain that their districts will not provide the training, money or resources necessary to initiate such sweeping changes. The teachers' complaints range from "the district will not purchase user manuals or training programs because they are too expensive" -- to being told to "purchase needed software with their own money because they can get an educator's discount." Teachers have also been directed to "request whatever they need for technology implementation... but remember that these purchase requests have to come out of the regular instructional budget." This administrative double speak has served to thwart teachers' efforts while all the talk about the Information Superhighway falls increasingly on deaf ears. The point is clearly stated by teachers when they contend "[They] will not be responsible for implementing technology without first being well trained and provided with the necessary resources."

School Facilities

Although schools may not presently be able to attain ideal facilities for technology equipment, each school should identify the physical facilities needed in a technology plan so that educators can develop a list of priorities that will help them obtain these needed arrangements. The question most teachers (especially elementary) are asking is "Now that we have them, where do we put them?" One first grade teacher stated:

> I'm not going to give up my reading circle space just so the administration can unload computers in my room. The rule in my school now is five computers in every classroom. It would make better sense to have one computer in each room and set up a computer lab for the entire school to use. Someone better tell me, too, where to store all the manipulatives we have purchased for the children. There simply is not enough space to fit everything.

The classroom of yesterday, although adequate for housing thirty students in five straight rows, is inadequate for containing those same thirty students who now require computer workstations in order to perform the gamut of todays technological tasks. Spatial arrangements for equipment and traffic flow, furniture placement, and power outlet sources have become a concern for teachers in most schools. For example, in older buildings where conduit is not available, wires on the floor are invitations for student and teacher injuries. Stuffing students and equipment into small rooms also increases the chance of equipment breakage, greater discipline problems, and frayed nerves on the part of teachers and students due to the lack of individual space. Teachers are very concerned about these physical facility issues as well as issues related to security.

Security Requirements

Many teachers resent the all-encompassing warnings several administrators have made such as "You're responsible for stolen equipment, vandalism, viruses, and equipment breakage." Some teachers have felt so threatened by these statements that they deliberately resist using technology equipment. They

believe it is unfair to place such undue responsibilities and burdens on them. Teachers recognize that computer viruses are as widespread as the common cold and that protecting equipment from being stolen or damaged is a common problem in most school districts. Teachers acknowledge that this is a shared concern for a school system, but they contend that administrators should bear the major burden of this responsibility. Teachers have stated "School boards and administrators should know that these things will happen - we just do not want the finger of blame pointed at us when it does." Administrators are in the position to establish requisite procedures and policies that address these security issues. Security precautions can be a costly expense; however, they are usually more cost effective than replacing stolen or vandalized equipment. Sadly, just as home security systems have become essential, school security systems appear to be imperative.

Management for the Acquisition of Supplies

Teachers are increasingly concerned about the availability of consumable technology supplies (e.g., toner, ink cartridges, videotapes, diskettes) as well as the lack of available technology accessories (mouse pads, copy holders, diskette containers, computer covers, printer stands, switch boxes). Running out of sticks of chalk in yesterday's classroom was one thing (you could always find broken pieces); however, running out of toner completely shuts down the technological operation in today's school. A media specialist shares this account:

> Our school houses a $4,500 laser printer; however the toner for the machine is kept at the central administration building. Whenever the laser printer runs out of toner, it takes three days to get a cartridge from the administrative office. Teachers have learned to remove the depleted cartridge from the machine and shake it in hopes of printing a few more copies, but that only works for about two more times. The bottom line is 'tough luck' if you need anything printed. What upsets the teachers is that they have been told by the administration to work around the problem. It is really frustrating for teachers when they are in the middle of a project or tests need to be printed!

This situation is not limited solely to printing demands. A similar story about another supply, VHS tapes, is related by a media specialist from a rural school system:

> Our school system owns a satellite dish... so the teachers requested that the feed be taped for use in the classroom. The joke is that our school has state of the art video recording equipment but blank video tapes were not purchased to record programs. The reason the administrator gave us was that video tapes were too expensive for the school to buy. So, he suggested that if teachers wanted this service, they would have to purchase VHS tapes with their own money.

Administrators must anticipate and make budgetary provisions for continual expenditures of consumable technology supplies. Indeed, making these projections is difficult because baseline purchasing data on new technologies is non-existent or incomplete. However, there is one sure point to remember - as the integration of technology increases within the school, the amount of consumable supplies and accessories necessary to sustain this effort also increases proportionally. It is recommended that administrators establish permanent line items for technology expenses in the school's budget rather than lumping these expenditures under yesterday's instructional budget umbrella. Budgeting an adequate amount of money for consumable and accessory technology needs is just part of the total cost for technology implementation. Another major administrative financial pratfall is allocating money for the maintenance of technology.

Maintenance Needs

Because of the sophisticated nature of today's computer and technology systems, educators cannot be expected to solve complicated equipment malfunctions and maintenance problems. One of the cardinal rules technology specialists stress is "Do not tamper with the control panels on the computer, unless you fully know what you are doing." Recklessly clicking commands, changing passwords, and altering subscriber number codes are sure ways to guarantee greater functioning foul-ups. Intentionally hammering on the tops of computer platforms, forcing disks in hard drives, and attempting "to fix" computers without proper training or tools are proven ways to ensure hardware damage. One library specialist shared an

account about a teacher lab coordinator who attempted to repair a cracked plastic casing on a dot matrix printer by using super glue. Unfortunately, "He not only glued the crack in the plastic cover of the printer, the glue seeped into the interior of the machine and froze the printers gears. If this mistake was not great enough, the administrator had the dot matrix printer repaired, and the cost of fixing this outdated printer almost exceeded the cost of purchasing a new, upgraded ink jet printer."

Many of these problems can be avoided if administrators develop proactive policies to prevent such disasters. Administrators should not falsely assume that there will be few technology-related problems, nor that equipment malfunctions can be solved by their faculty or staff. School districts must develop maintenance contracts with outside agencies or set up an in-system department and hire special technology personnel. The overwhelming majority of teachers simply do not possess the technical skills necessary to guarantee that technological equipment will be operative.

Selecting one maintenance option over another (out-sourced versus in-system) is a difficult administrative decision, and teachers report that there are problems and limitations with both methods. For example, an educator who teaches in an out-sourced system explains:

> Our maintenance contract provides for technical support one day per week. There are six buildings in my district, including the administration building, and each and every week at least one of the schools loses out. The tech rep always attends to the needs of the administration building first, so they never experience a one or two week delay. The administrative office fails to realize how angry and disappointed the teachers are at the non-serviced buildings.

Teachers also dislike filling out technical support requests on triplicate forms, being told to schedule appointments with tech reps (as though they can schedule the breakdowns of their computers), and being warned not to talk to tech reps when they are servicing equipment in the building, because the reps are getting paid by the hour. Some schools have tried alleviating some of these problems by designating one teacher per building to act as a technical liaison with the contracted company. This arrangement has been fraught with difficulties, too.

Teachers who serve as technical liaisons find themselves in the unenviable position of providing troubleshooting and stopgap maintenance for their colleagues. They complain because generally they are not reimbursed for this service, oftentimes tech reps do not return their calls in a timely fashion, and they are frustrated with trying to maintain current information about so many different computer hardware systems and software. One special education teacher who also serves as a technical liaison comments, "I rarely ever get through a day without a student coming up to my room bearing a request from a fellow teacher for immediate help with a computer problem. These interruptions are troubling given I teach developmentally handicapped and learning disabled students, and there is no way I can leave my classroom unattended even for a few minutes. Teachers just have to wait until the end of the day for my assistance, and that does not help them when their computer has frozen."

Teachers have also attempted to alleviate some of these technical problems on their own by contacting the technical support division of the computer and/or software company. Dial 1-800-(computer) Help! is a frequent byword in many schools. However, teachers report that being placed on hold when they make these calls or being asked to read what is on the computer screen can cause considerable difficulties when the school's phone is located in the principal's office and their computer is on the third floor of the school building. Teachers exclaim, "School systems lack basic technology equipment such as portable phones!" These procedures appear to most teachers to be poorly considered and uncoordinated approaches for technology maintenance.

Some school districts choose to hire their own technicians and establish internal offices to manage technology maintenance needs and support services. However, as both teachers and technicians relate, this technical support measure is not a panacea either. Teachers lament that "the salary of a technician is often much higher (usually double) that of a teachers salary, and that technology specialists know nothing about the instructional needs of educators." Many school systems also report that the turnover in technical support personnel is high and that it is difficult to hire persons who possess both technical competency and interpersonal skills, and who also prefer working in a school rather than a business environment.

Conclusion

The implementation of technology into today's schools requires both administrators and teachers to be technology leaders. However, studies show that most administrators are not promoting the integration

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of technology into the school curriculum (Waxman & Huang, 1993). If administrators are to lead their schools forward, they must address teachers' concerns which are central to integrating technology into classroom practice. Issues such as training in technology, arrangements for facilities, space for technology equipment, security policies to guard technology investments, management strategies for the acquisition of technology supplies and accessories, and procedures for technical maintenance and teacher assistance are some of the major factors that impact the failure or success of technology implementation.

The ability of teachers to integrate technology into instruction is directly tied to the organizational environment and educational culture in which they work. Thoughtful administrators realize that the daily challenges of teaching work against technology implementation (time, training, resources, technical support). Administrators certainly can help teachers if they are willing to listen to teachers concerns about technology implementation, and provide innovative shared leadership to circumvent the constraints of the educational system. Just as the proper use of technology requires significant changes in how teachers teach, the successful implementation of technology into schools requires administrators to make significant changes in how they support their faculties.

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